

IDAHO

DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

MCCALL SUMMER CHINOOK SALMON HATCHERY

Annual Report



1 October 1983 - 30 September 1984

by
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MCCALL SUMMER CHINOOK SALMON HATCHERY

Annual Report

ABSTRACT

In April of 1984, 269,880 summer chinook smolts were released in the South Fork Salmon River. Prior to release, 51,576 fish were coded-wire tagged. There were 25,571 of these fish which were also freeze-branded.

From the 750,634 eggs collected at the South Fork trapping facility last year, approximately 566,000 pre-smolts are on hand for release in 1985.

Record numbers of adults returned to the South Fork in 1984. A total of 1,529 fish including 503 females, 431 males and 595 jacks were trapped. One hundred, twenty-four females, 174 males and 39 jacks were released upstream for natural spawning. Three hundred fifty-three females were spawned, yielding 1,613,392 eggs. Nearly 50% of the returning adults were adipose fin clipped.

Adults tested negative for the presence of virus, but bacterial kidney disease and Ceratomyxa shasta spores were found in significant numbers.

In March of 1984, 230,550 spring chinook smolts were released in the Salmon River upstream of the Sawtooth Hatchery site. Prior to release, 104,888 fish including 34,012 freeze branded fish were coded-wire tagged.

From the 650,196 eggs received from the Sawtooth trapping facility last year, approximately 433,000 pre-smolts are on hand for release in 1985.

"Spring Thing" accounted for losses of 9.1% and 11.2% in the summer and spring chinook. Diet studies at McCall and the Fish Cultural Development Center in Bozeman, Montana, were conducted this year to evaluate various diets and their effect on this disease. At McCall, one diet (OMP-4 + 10 times pantothenic acid) out performed all others. Results from Bozeman were inconclusive.

Bacterial kidney disease was found in all production fish and erythromycin thiocyanate was administered. No significant mortalities could be attributed to this disease.

A four-month study evaluating hand feeding and automatic feeders was conducted. No conclusive advantages to either method were found.

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OBJECTIVES

The anadromous production objectives of the McCall Hatchery were:

1. To raise 500,000 summer chinook smolts for release in the South Fork Salmon River.
2. To trap and spawn adult salmon returning to the South Fork Salmon River.
3. To raise 500,000 spring chinook smolts for release in the Salmon River.
4. To evaluate fish rearing capabilities of the McCall facility.

The resident production objectives were:

1. To redistribute approximately 35,000 pounds of catchable-size rainbow trout into area lakes and streams.
2. To raise approximately 1,000,000 trout fry for stocking in lowland waters and mountain lakes and for redistribution to other hatcheries.
3. To stock nearly 600 mountain lakes in Regions 2 and 3 on a three-year rotation basis.
4. To operate and maintain a fish trap at Fish Lake for the purpose of obtaining westslope cutthroat eggs.

This report covers all federal objectives accomplished at McCall Hatchery. For a report on state objectives see Parrish (1985).

INTRODUCTION

The McCall Summer Chinook Hatchery was constructed in 1979-80 as part of the Lower Snake River Compensation Plan (LSRCP). Congress authorized the LSRCP to compensate Idaho, Oregon and Washington for losses of fish and wildlife caused by the Lower Snake River projects (Ice Harbor, Lower Monumental, Little Goose and Lower Granite dams). This plan will provide hatchery capacity in Idaho for the rearing of 5,600,000 chinook salmon smolts and 5,900,000 steelhead smolts. McCall Hatchery is the first hatchery to be constructed as partial fulfillment of the LSRCP.

McCall Hatchery was constructed by the U.S. Army Corps of Engineers. Operational funds are provided by the U.S. Fish and Wildlife Service (USFWS) and the facility is staffed and operated by the Idaho Department of Fish and Game (IDFG). It is located within the city limits of McCall, Idaho, on the North Fork Payette River approximately 1/4 mile downstream from the dam regulating Payette Lake. Hatchery water is obtained from Payette Lake through a 36-inch underground pipeline. Water may be taken from the surface or from a depth of 50 feet, thus providing the capability of obtaining the best water temperature available (Fig. 1). At maximum capacity the facility requires 20 cfs of water. Fish rearing facilities include: 26 eight-tray stacks of Heath incubators, two fiberglass Heath troughs (1.75' x 15.5'), 14 concrete vats (4' x 40'), two outdoor concrete rearing ponds (42' x 200') and one collection basin (15' x 101'). Design capacity of the hatchery is for production of 1,000,000 smolts averaging 17 fish per pound.

An adult trapping and spawning facility is located on the South Fork Salmon River (SFSR), near Cabin Creek, approximately 26 miles east of Cascade, Idaho. This facility is equipped with a removable fish weir, a fish ladder, a trap, two adult holding ponds (10' x 88') and a covered spawning area. Water is supplied from the SFSR through a 33-inch underground pipeline. Holding capacity for the facility is 750 adults. After spawning, green eggs are transferred to McCall for incubation, hatching and rearing. The resulting smolts are transported back to the SFSR and released.

GENERAL FISH CULTURE AND HEALTH

Loading

Heath incubators are loaded with approximately 80 ounces of eggs per tray. Eyed eggs are shocked after they accumulate 500 temperature units (TU). Dead eggs are removed by the salt floatation method (Lietritz and Lewis 1976), and eyed eggs are counted using the water displacement method described by Piper et al. (1982).

After accumulating 1,600 TU, fry are transferred to vats. Vat rearing volumes are established and changed by setting screens and drop gates at various distances and depths, insuring that fish densities are maintained at or below the Maximum Density Index (MDI) as recommended by Klontz (1979). Fish are transferred to the outdoor rearing ponds when they are about 250 fish per pound and held until their release at approximately 17 fish per pound.

Hygiene

Eggs received at McCall are disinfected in a 1:300 aqueous solution of Argentyne for ten minutes. A 0.5% concentration of sodium bicarbonate is added as a buffering agent against the acidifying

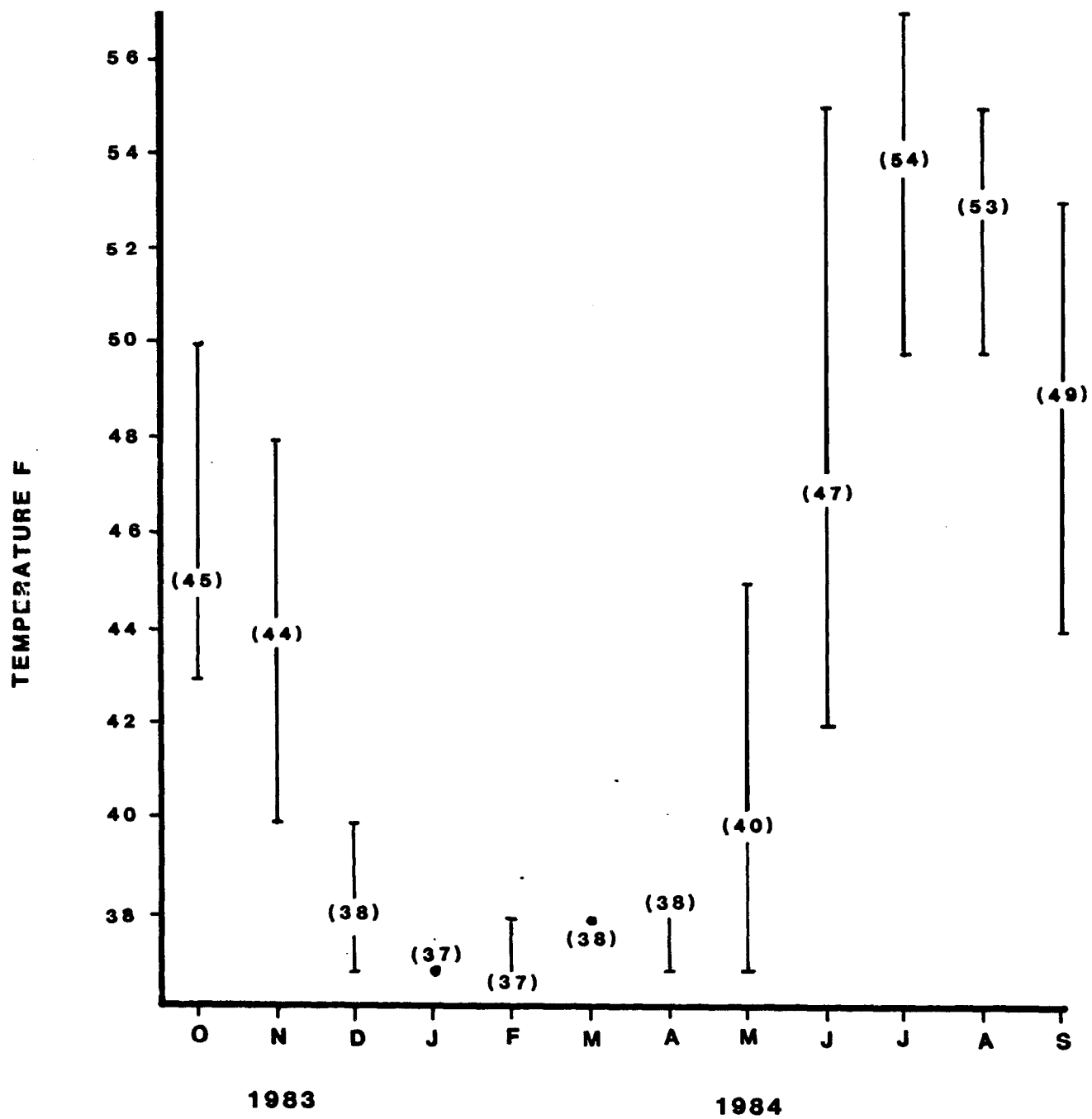


Figure 1. Monthly temperature ranges (and average daily temperature) of McCall Hatchery water.

effects of Argentyne in soft water (Wood 1979). An ultraviolet light water purification system is used on incubation water. For added protection against fungal invasion, eggs are administered formalin treatments at a 1:600 concentration as needed.

Hatchery vats are cleaned daily and brushes and nets designated for each vat are disinfected in a 600 ppm Benzalchonium Chloride (50%) solution after each use. Hatchery personnel are required to disinfect their hands before cleaning any vat. Mortality is collected daily, recorded and frozen for disposal. The outside rearing ponds are cleaned as needed by means of a vacuum system, discharging into the settling pond. Mortalities are collected, recorded and frozen for disposal.

Inventories

Fish are inventoried on the 1st and 15th of each month. Length/weight relationships are determined, feeding levels adjusted, MDI calculated and necropsies are performed on a few fish to monitor general fish health.

SOUTH FORK BROOD YEAR 1982

Production

From April 9-11, 269,000 (17,300 pounds) summer chinook smolts were released in the SFSR at Knox Bridge (Table 1). They averaged 15.6 fish per pound and 136.4 mm (5.4") fork length (Fig. 2).

Conversion

A total of 28,855 pounds of Oregon Moist Pellets (OMP) fish feed was fed to produce 17,300 pounds of fish (Table 2). A conversion ratio of 1.67 was attained for this brood year.

Disease

No major disease problems were encountered in the 1982 brood year fish this year. Bacterial kidney disease (BKD) was found in light concentrations. Feed containing erythromycin thiocyanate at four grams active ingredient (AI) per 100 pounds of fish was fed for 21 days. Prior to release, fish were tested for the presence of BKD by using the fluorescent antibody test (FAT). Results showed 83% negative, 14% "light" incidence, 2% "moderate" and 1% had a "heavy" incidence of the bacterium. Upon release, all fish were in excellent condition but contained a moderate infestation of the gill parasite Tricophrya sp.

Table 1. McCall Hatchery fish production, 1 October 1983 -
30 September 1984.

Brood Year	Species	Numbers Produced	Pounds Produced
1982 1/	Summer chinook	269,880	17,300
1982 1/	Spring chinook	230,550	14,500
1983 2/	Summer chinook	566,000	17,112
1983 2/	Spring chinook	433,000	12,138
Totals		1,499,430	61,050

1/ planted

2/ on hand

Table 2. Feed conversion and cost per pound of fish produced.

Brood Year	Species	lbs Of Fish Produced	lbs Fish Feed Fed	Cost	Conversion	Feed Cost/lb Produced
1982	summer chinook	17,300	28,855	\$13,794.45	1.67	\$0.797
1982	Spring chinook	14,500	28,320	13,538.69	1.95	0.934
1983	Summer chinook	17,112	27,054	13,715.59	1.58	0.802
1983	Spring chinook	12,138	19,190	9,728.78	1.58	0.802
Totals		61,050	103,419	\$50,777.51	1.69	\$0.832

Total cost per pound of fish produced, excluding capital outlay = \$ 5.979

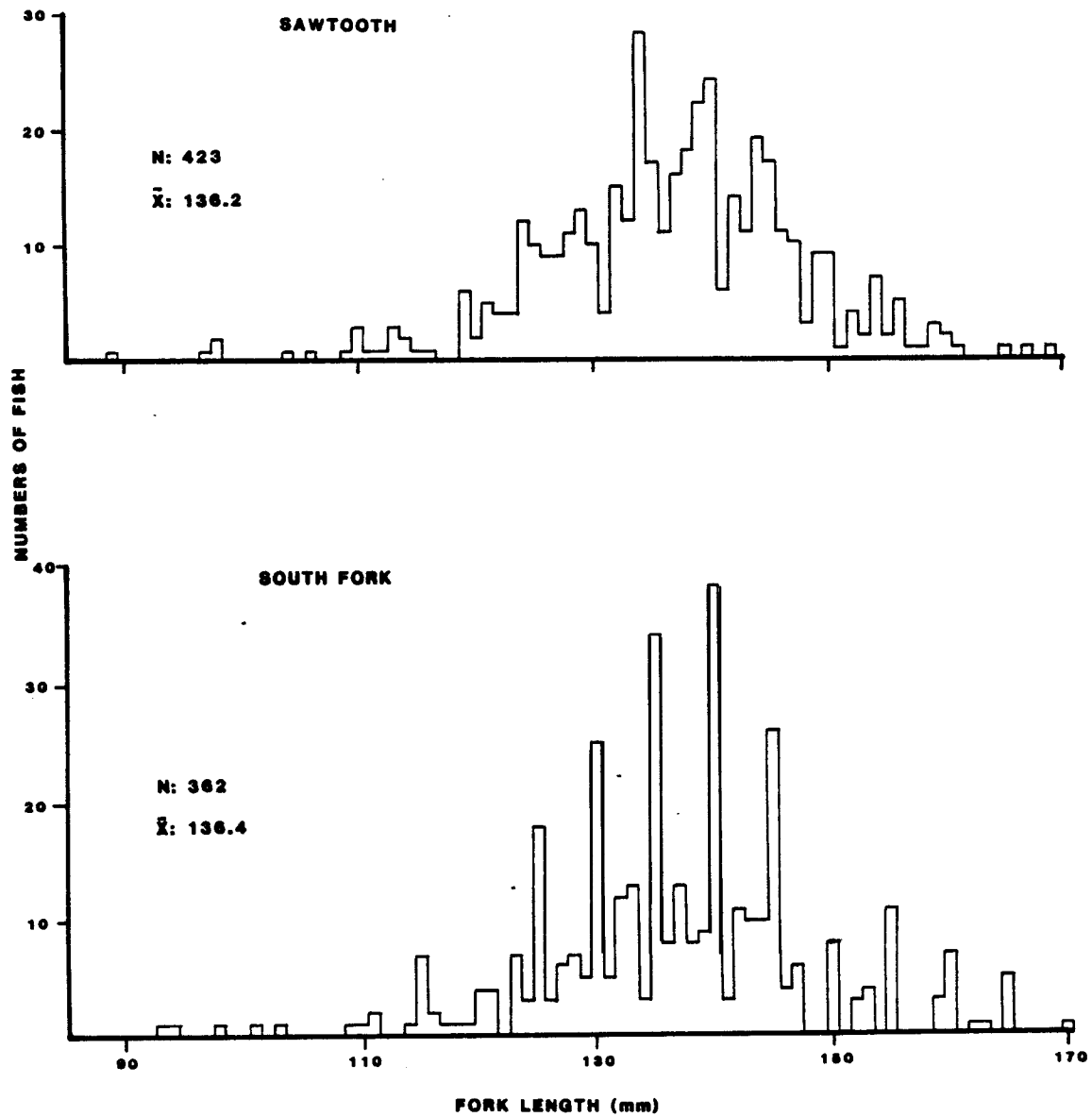


Figure 2. Length frequencies of South Fork and Sawtooth chinook smolts.

SOUTH FORK BROOD YEAR 1983

Production

From the 750,634 eggs collected at the SFSR trap in 1983, approximately 566,000 fish (17,112 pounds) are on hand for release during April 1985 (Table 1).

Conversion

A total of 27,054 pounds of OMP fish feed was fed to this brood year resulting in a conversion of 1.58 pounds of feed required to produce one pound of fish (Table 2).

Disease

During the year, two fish health problems occurred in the 1983 brood year fish. "Spring Thing" (Hutchinson 1981) appeared from March through June and was responsible for 9.1% mortality in these fish. Progress is being made to identify and correct the cause of this unknown disease that has afflicted the McCall fish for the past five years (see McCall Nutrition Study).

The second problem was caused by BKD, but no significant mortalities occurred. Hatchery personnel first detected the presence of Renibacterium salmoniarum through microscopic examination, and confirmation was made by IDFG Fish Pathologist Harold Ramsey through

FAT. Test results indicated 75% of the fish to be negative, while infestations of "light", "moderate" and "heavy" each had incidence rates of 8%. Fish were fed for 21 days on feed containing erythromycin thiocyanate at 4.5 grams AI per 100 pounds of fish. Mortality ranged from 10-50 fish per day for three weeks and subsided to normal levels one month after feeding medication.

Shortly after these fish had buttoned up, a few fish were observed with swollen abdomens and hemorrhagic areas near the vent and fin bases. Microscopic examination revealed balls of fungal mycelia in the swim bladder and viscera. No significant mortalities occurred as a result of this infection.

A light infestation of trichophrya is present in the fish, but no adverse effects can be attributed to this parasite. Because of the harsh treatment required to eliminate the parasite, no actions have been taken to eradicate it.

ADULT RETURNS AND BROOD YEAR 1984

Trapping and Spawning

A record number of adult chinook returned to the SFSR in 1984. A total of 1,529 fish (503 females, 431 males and 595 jacks) were trapped during the period July 9 - September 5 (Fig. 3). We released 124 females, 174 males and 39 jacks upstream for natural reproduction and escapement. Fork lengths of all fish were recorded at time of capture (Fig. 4).

Spawntaking began on August 6 and concluded on September 4. During this period, 353 females were spawned, yielding 1,613,392 eggs (4,571 eggs per female). Twenty-six females (5.2%) died prior to spawning from undetermined causes.

In an attempt to reduce the potential spread of disease from females to eggs, all eggs taken this year were drained of ovarian fluid prior to fertilization. Eggs from three females were drained in a colander and placed in a bucket. Pooled sperm from five males was added along with water to promote fertilization. Eggs were then rinsed and water-hardened for one hour in a two ppm Al concentration of erythromycin phosphate (Gallimycin, Abbot). Due to unknown causes, the fertilization rate was 15% lower than normal. Only a 76.3% eye-up was achieved.

Of the returning adults, 721 had adipose fins absent, indicating the possible presence of a coded-wire tag. Snouts from these fish were collected after spawning and sent to Rod Duke for tag recovery and code identification (Table 3).

As no injections of erythromycin were administered, all spawned-out fish suitable for human consumption were given to the general public and the Shoshone-Bannock tribe, which received 400 fish for their tribal members.

Disease

Returning adults were sampled by hatchery personnel and tested for the presence of virus and BKD. During a three-week period, ovarian fluid from 65 females and tissue samples from 65 randomly selected fish were screened for virus. Samples were sent to the International Aquaculture Research Center, Hagerman, Idaho, and all tested negative. Kidney imprints from 349 fish were collected and sent to the Hagerman Fish Disease Lab for FAT analysis. Samples were categorized into three groups: adults, jacks and pond mortalities. From the 162 adults tested, 44% were positive, while 155 jacks showed 35% to be positive. Of the 32 pond mortalities tested, 50% were positive for BKD.

Table 3. Coded-wire tag recovery data.

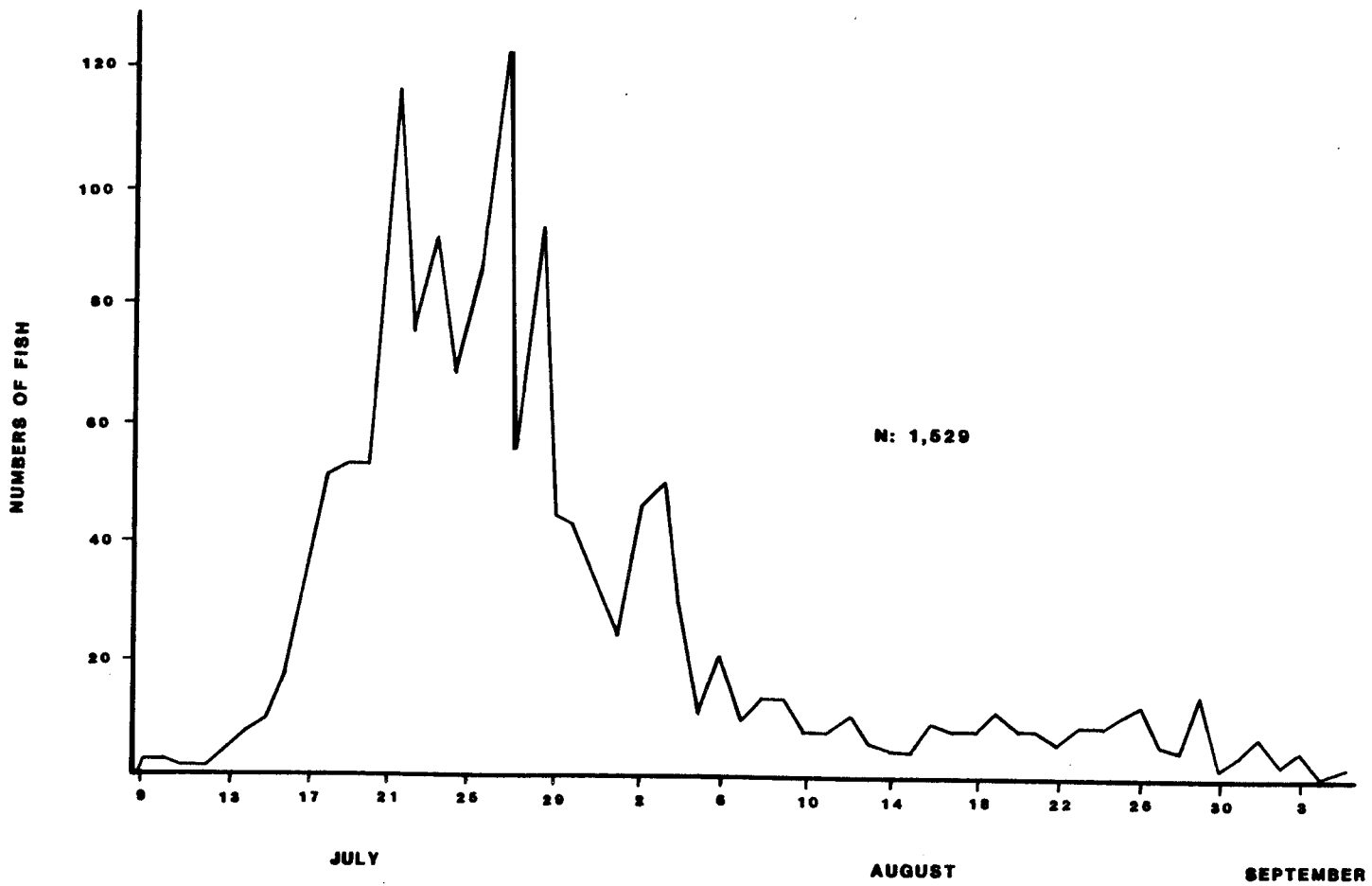
Fork Length cm	102117 1981 3-ocean Males	102117 1981 Release 3-ocean Females	102118 1981 Release 3-ocean Males	102118 1981 Release 3-ocean Females	102128 1981 Release 3-ocean Males	102128 1981 Release 3-ocean Females	102412 1982 Release 2-ocean Males	102412 1982 Release 2-ocean Females	102413 1982 Release 2-ocean Males	102413 1982 Release 2-ocean Females	102458 1983 Release 1-ocean Males
47											2
48											1
50											1
51											10
52											5
53											11
55											12
56							4				18
57									1	1	14
58							1				12
60											11
61											11
62							2		1		7
64							1				2
65									2		1
66			1				1				3
67					1				1		1
69			1				2		4		
70							2		1		1
71							10	1	5	1	
72							6		1	2	
73							1				
74							9	8	8	8	
75							3	4	2	6	
76			1				10	17	9	20	1
78			1		1		2	7	4	14	1

Table 3. (con't).

Fork Length cm	102117 1981 Release 3-ocean Males	102117 1981 Release 3- ocean Female	102118 1981 Release 3- ocean Males	102118 1981 Release 3-ocean Females	102128 1981 Release 3-ocean Males	102128 1981 Release 3-ocean Females	102412 1982 Release 2-ocean Males	102412 1982 Release 2- ocean Female	102413 1982 Release 2- ocean Males	102413 1982 Release 2- ocean Females	102458 1983 Release 1-ocean Males
79			1				8	22	9	15	1
80							3	11	2	14	
81		1		1			11	20	6	16	
82							1			1	
83			1					2	5	5	
84		1					3	8	6	11	
85							3	4			
86							5	5		1	
88				1		1				1	
89				1		1		3	2		
90		1		1			1				
91		1	1	1				1	1		
92						1					
93			1								
94		2		3		2				1	
95			1					1			
96						1					
97				1	1		1		1		
98			1	1		1					
99					2						
100	1		1		1		1				
102			2								
104			1		1						
107					2						
TOTALS	4	6	11	10	8	7	91	114	71	117	126

Note: Forty-nine snouts contained no tag and length data on 56 males
data code 102458 not available

Figure 3. Timing of returning adults to the South Fork Salmon River trap.



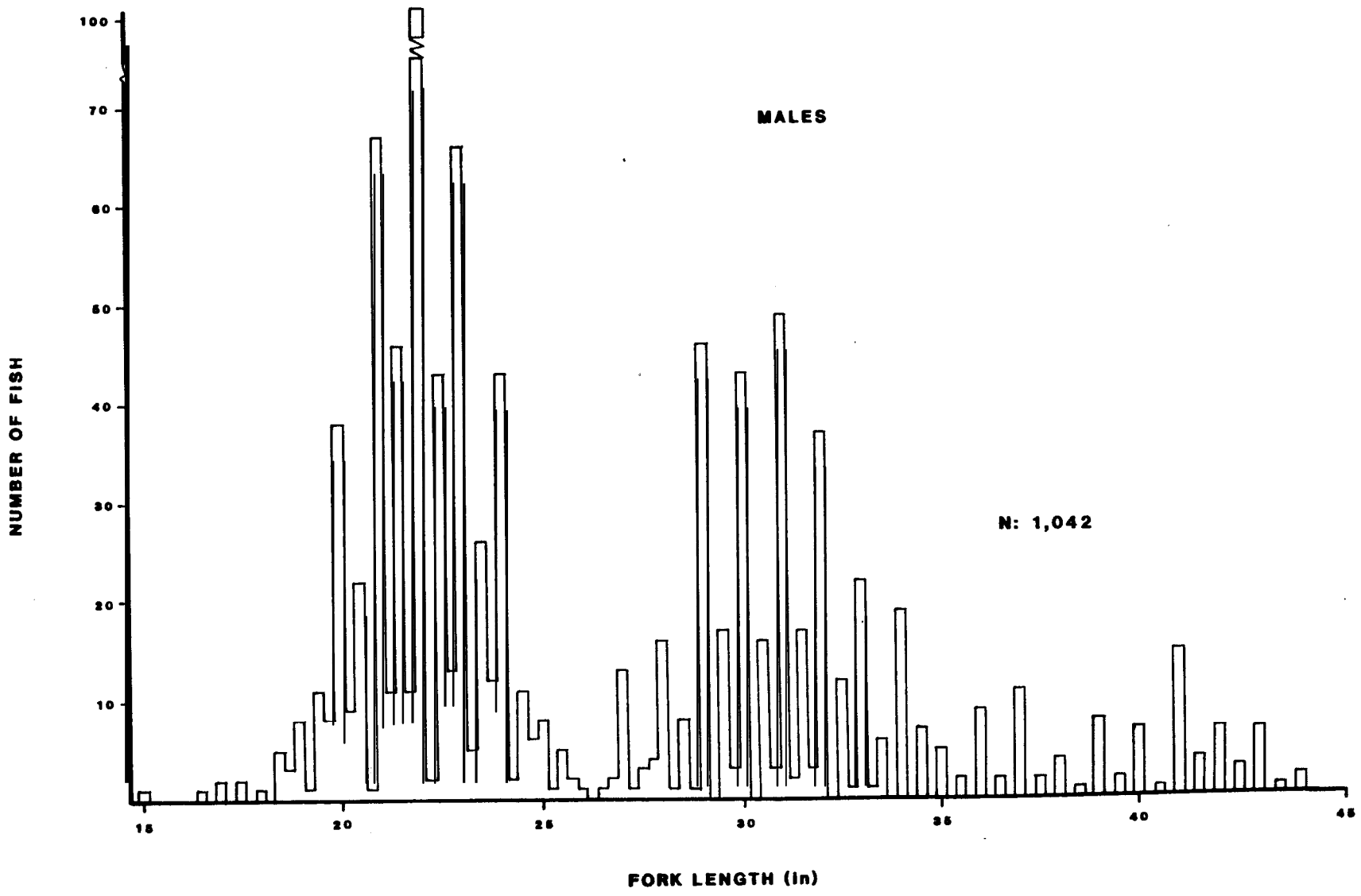
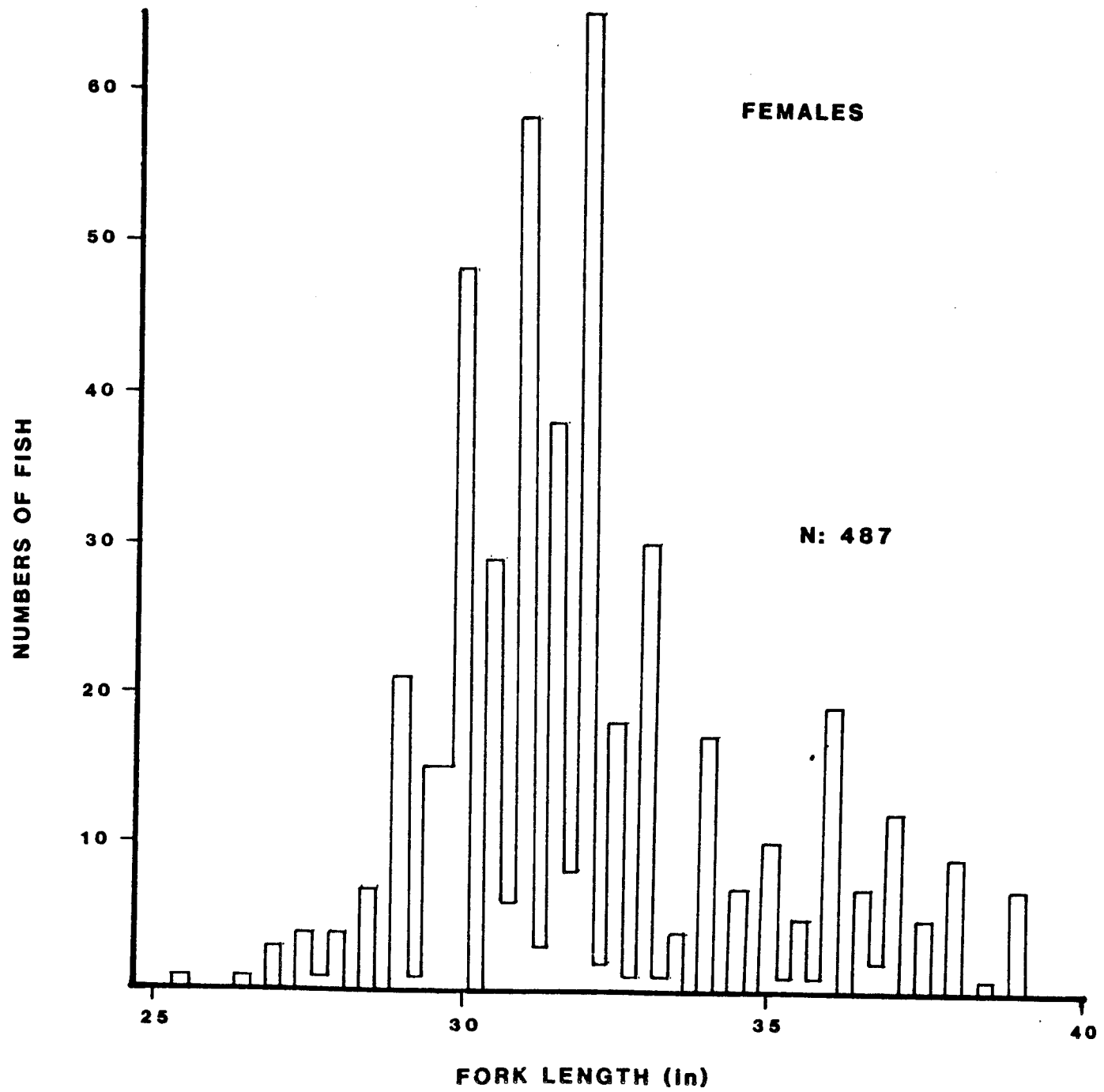


Figure 4. Length frequencies of adult chinook trapped at the South Fork Salmon River.

Figure 4. con't



Hatchery personnel also sampled 122 adults and checked them for the presence of Ceratomyxa shasta spores and Erythrocytic Necrosis Virus (ENV). Results indicated that 36% of all fish sampled contained ceratomyxa spores; pond mortalities showed a 65% incidence. Although no conclusive results can be determined from this data, I feel Ceratomyxa shasta may contribute to prespawning mortality. Blood smears from 90 fish were examined for cytoplasmic inclusions in the erythrocytes, the indicator of ENV infection. All samples tested negative (Pat Chapman pers. comm.).

SAWTOOTH BROOD YEAR 1982

Production

On March 27 and 29, 1984, 230,550 (14,500 pounds) spring chinook smolts were released in the Salmon River upstream of the Sawtooth Hatchery site (Table 1). These smolts averaged 15.9 fish per pound and 136.2 mm (5.3") fork length (Fig. 2).

Conversion

A total of 28,320 pounds of OMP fish feed was fed to this brood year resulting in a conversion of 1.95 (Table 2).

Disease

No major disease problems were encountered in these fish during the year. Light concentrations of BKD were found and fish were administered erythromycin thiocyanate at four grams AI per 100 pounds of fish for 21 days. No significant mortalities occurred as a result of this infection. Prior to release, fish were tested for BKD. FAT results indicated that 86% were negative and 14% had only a "light" incidence of bacteria. Upon release, these fish had a moderate infestation of tricophrya, but other than that were in excellent condition.

SAWTOOTH BROOD YEAR 1983

Production

From the 650,200 eggs collected at the Sawtooth trapping facility and transported to McCall in 1983, approximately 433,000 (12,138 pounds) fish are on hand for release into the Salmon River during the spring of 1985 (Table 1).

Conversion

A total of 19,190 pounds of OMP fish feed was fed, resulting in a conversion of 1.58 (Table 2).

Disease

These spring chinook were afflicted with the same diseases that the summer chinook contracted. "Spring Thing" was the most serious and accounted for a mortality of 11.2%. Bacterial kidney disease was also found but no significant mortalities occurred. FAT tests for BKD indicated that 83% were negative, while 8% had "light", 4% "moderate" and 4% "heavy" incidence rates of bacteria. These fish were fed erythromycin thiocyanate at the same levels as the summer chinook.

Internal fungus was also found in these fish but caused no serious problems. At the end of the year, light concentrations of trichophrya were found on their gills.

SPECIAL STUDIES

Bozeman Nutrition Study

During 1984, a cooperative nutrition study was conducted at the Fish Cultural Development Center, Bozeman, Montana. The objectives were to evaluate various diets with regard to growth, conversion and their effects on the incidence of "Spring Thing." Age-0 chinook from the SFSR 1983 brood year were used in this study. Presumably due to differences in water temperature (50 F) and quality, the disease that has plagued McCall for the past five years did not occur. They were able to evaluate the various diets as to conversion, growth, mortality but no statistically significant differences were found. It was felt one diet (OMP-4 + 10 times the normal amount of pantothenic acid) produced a better quality fish (Charlie Smith pers. comm.).

On June 6, 1984, the 30,990 age-0 chinook used in the study were released in the SFSR at Stolle Meadows. They were 30 fish per pound, 76 mm (3") in length and had a right pectoral fin clip.

McCall Nutrition Study

Four years of investigation and testing into the cause of "Spring Thing" have led to the conclusion that it is nutrition related. In a cooperative agreement with the USFWS, a two-year study evaluating various diets and their effect on "Spring Thing" began this year. Commercial diets were used with various vitamin supplements added. This year's study at McCall will be written in a detailed report and submitted for future publication (Hutchinson and Chacko, in press).

The 1984 study involved the 1983 brood year summer chinook. Diets used were: 1) OMP-4, 2) OMP-4 + 10 times pantothenic acid, 3) OMP-4 + four times the normal vitamin package, 4) OMP-4 that had been vacuum packaged, and 5) OMP-4 + processed beef liver.

Results from 100 days on feed showed all test groups experiencing mortalities resulting from "Spring Thing." However, compared with previous years, mortalities in all groups were substantially lower. The OMP-4 + pantothenic acid diet had the lowest mortality (0.8%), the highest percent gain (173.7%) and the highest condition factor ($C = .3504 \times 10^3$) (Table 4). Further diet evaluations will be conducted next year focusing on vitamin and mineral supplementation. It appears that we are finally making substantial progress in controlling this disease.

Coded-wire Tagging

In February, 1984, Rod Duke and his tagging crew differentially coded-wire tagged, adipose fin clipped and freeze branded one group each from the 1982 brood year summer and spring chinook. The SFSR group contained 51,576 fish, of which 25,571 were branded with a "J" on the left dorsal surface (LD-J-1). In the Sawtooth spring chinook group, 104,888 were tagged, of which 34,012 were branded with a "T" on the left dorsal surface (LD-J-3).

Fish were branded in order to identify their origin when captured at the collection and transportation facility at Lower Granite Dam. The 1982 summer chinook were released at the SFSR during April 9-11, 1984, and branded fish were observed at Lower Granite during the period April 20 - June 14. An estimated 12,296 fish passed Lower Granite with the peak occurring during the middle of May (Table 5). This is an index count of migration timing and represents only an estimate of the fish surviving past Lower Granite.

Hand Feeding vs. Automatic Feeders

A four-month study evaluating two feeding methods, hand feeding and Nielsen automatic feeders, was conducted on production fish in the two outside rearing ponds. Objectives were to compare each method with regard to conversion, growth, condition factor and pond cleaning frequency. Both ponds were fed at the same levels (percent body weight) using identical fish feed, but pond #1 contained summer chinook and pond #2 contained spring chinook. Results indicated that, although hand feeding produced a slightly better conversion and growth rate, no advantage could be seen from either feeding method (Table 6).

Advantages to automatic feeders are substantial time saved in feeding fish and an increase in the number of feedings per day. However, automatic feeders may promote a tendency to fill the feeders and forget about the fish. In contrast, hand feeding forces people to watch the fish (an important fish cultural practice). This study will be repeated next year.

Table 4. Nutrition study data comparing five diets for 100 days (1984).

Diet	Fish/lb at start	Fish/lb at end	Percent gain	Length (mm) at start	Length (mm) at end	Condition factor *	% Mortality	Cost/lb fish produced
OMP-4	1,022.9	562.5	81.8	36.7	46.4	.2915	1.7	\$ 3.20
OMP-4 + acid	1,135.0	414.7	173.7	37.4	48.3	.3504	0.8	2.25
OMP-4 + vit	1,061.7	523.9	102.7	37.4	46.7	.3069	1.7	2.19
OMP-4 vacuum	1,022.9	592.8	72.6	36.7	47.1	.2646	1.9	4.09
OMP-4 + liver	1,061.7	428.3	147.9	37.4	49.7	.3115	1.3	6.12

* C = weight/Length³ x 10⁻³

Table 5. Timing of arrival and estimated passage index of branded
McCall Hatchery summer chinook at Lower Granite Dam."

Date	Number observed	Estimated collected	Estimated passed
4/24-4/30	18	124	503
5/1-5/7	38	468	1,966
5/8-5/14	26	775	2,521
5/15-5/21	42	952	4,123
5/22-5/28	47	525	2,360
5/29-6/4	19	141	630
6/5-6/12	6	47	193
Totals	196	3,032	12,296

»Brand recapture summary (NMFS).

Table 6. Comparison of data between hand and automatic feeding.

Date	Fish/lb		Length (in)		Conversion		Condition Factor *		% Wt. Increase		% Length Increase	
	Hand	Auto	Hand	Auto	Hand	Auto	Hand	Auto	Hand	Auto	Hand	Auto
6/1	244.1	260.7	2.38	2.29			.3046	.3188	101.2	123.2	29.8	32.8
7/1	121.3	116.8	3.09	3.04	0.91	0.70	.2782	.3061	75.8	46.7	13.3	8.9
8/1	69.0	79.6	3.50	3.31	0.82	1.42	.3391	.3448	44.7	60.5	10.6	11.8
9/1	47.7	49.6	3.87	3.70	1.63	1.21	.3629	.4016	44.1	38.9	16.3	15.7
10/1	33.1	35.7	4.50	4.28	1.81	2.14	.3315	.3572				
Averages					1.39	1.45	.3233	.3457	637.5	630.3	89.1	86.9

* $C = \text{Weight}/\text{Length}^3 \times 10^{-3}$

Vibrio Vaccination

In 1981, a portion of the 1979 brood year summer chinook were vaccinated against Vibrio anguillarum as an evaluation of survivability (Hutchinson 1982). The study involved three groups of fish that were differentially coded-wire tagged. Group one was a control, group two was vaccinated and group three was administered a placebo. Snouts from returning adults were collected and analyzed as to data code (Table 7).

Table 7. Coded-wire tag data from 1981 vibrio vaccination study.

Data code	1-ocean returns (1982)	2-ocean returns (1983)	3-ocean returns (1984)	Total
10/21/17 (control)	6	28	10	44
10/21/18 (vacc.)	3	18	21	42
10/21/28 (placebo)	5	20	15	40

It appears that in this study, no significant advantages in survivability were achieved by vaccination. Next year, results from the 1982 vaccination study will be available and an overall comparison of McCall's vibrio vaccination program can be made.

MISCELLANEOUS ACTIVITIES

YCC

In cooperation with the USFWS, we obtained a Youth Conservation Corps (YCC) crew and crew leader this summer. The crew consisted of six local youths (ages 15-16) and one adult crew leader. They assisted us in several construction and clean-up projects at the SFSR trapping facility, Fish Lake and at the hatchery. The eight-week project was funded entirely by the USFWS and was truly a great help in completing our work assignments. Their work not only completed projects long overdue but enabled the hatchery staff to concentrate on higher priority projects. The crew should be commended on their job; the additional manpower was greatly appreciated.

Visitors

Over 4,000 people visited the hatchery during the year. Organized tours were given to the Corps of Engineers, Boise Cascade Corp., U.S. Forest Service, USFWS and classes from the Meadows Valley and the McCall-Donnelly kindergarten, grade and high schools. The South Fork trapping facility was also very popular this year. Over 3,000 people visited the trap during the two months of operation.

ACKNOWLEDGEMENTS

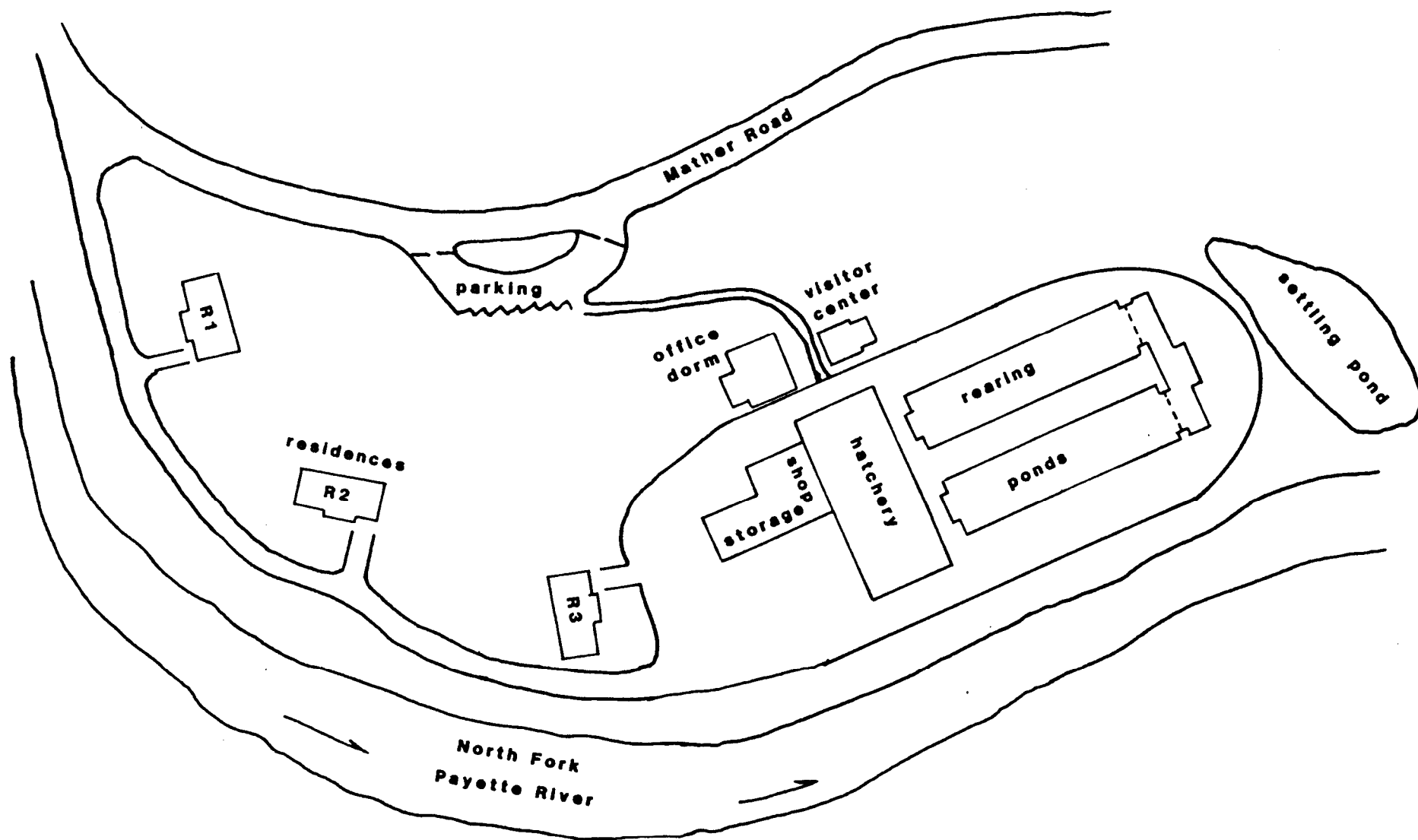
Hatchery staff during the year included: Bill G. Hutchinson, Fish Hatchery Superintendent II; Dave Parrish, Fish Hatchery Superintendent I; Jerry McGehee, Fish Culturist; Pat Chapman, Fish Hatchery Superintendent I (temporary); Dr. A. Jim Chacko, Fish Pathologist (temporary); June Morse, Christie Cockerham, Dave Pisarski and John Gebhards, Biological Aides; Karen Dorris, YCC crew leader; Steve Harris, Zane Cram, Debbie Bayless, Shane Bayless, Annette Petersen and John Bischoff, YCC crew members.

The hatchery crew would like to thank the following people for their contributions to disease investigations during the year: Harold Ramsey, IDFG Hagerman; Charlie Smith, USFWS Bozeman; Joe Lientz, USFWS Dworshak; and Pat Chapman, IDFG Dworshak.

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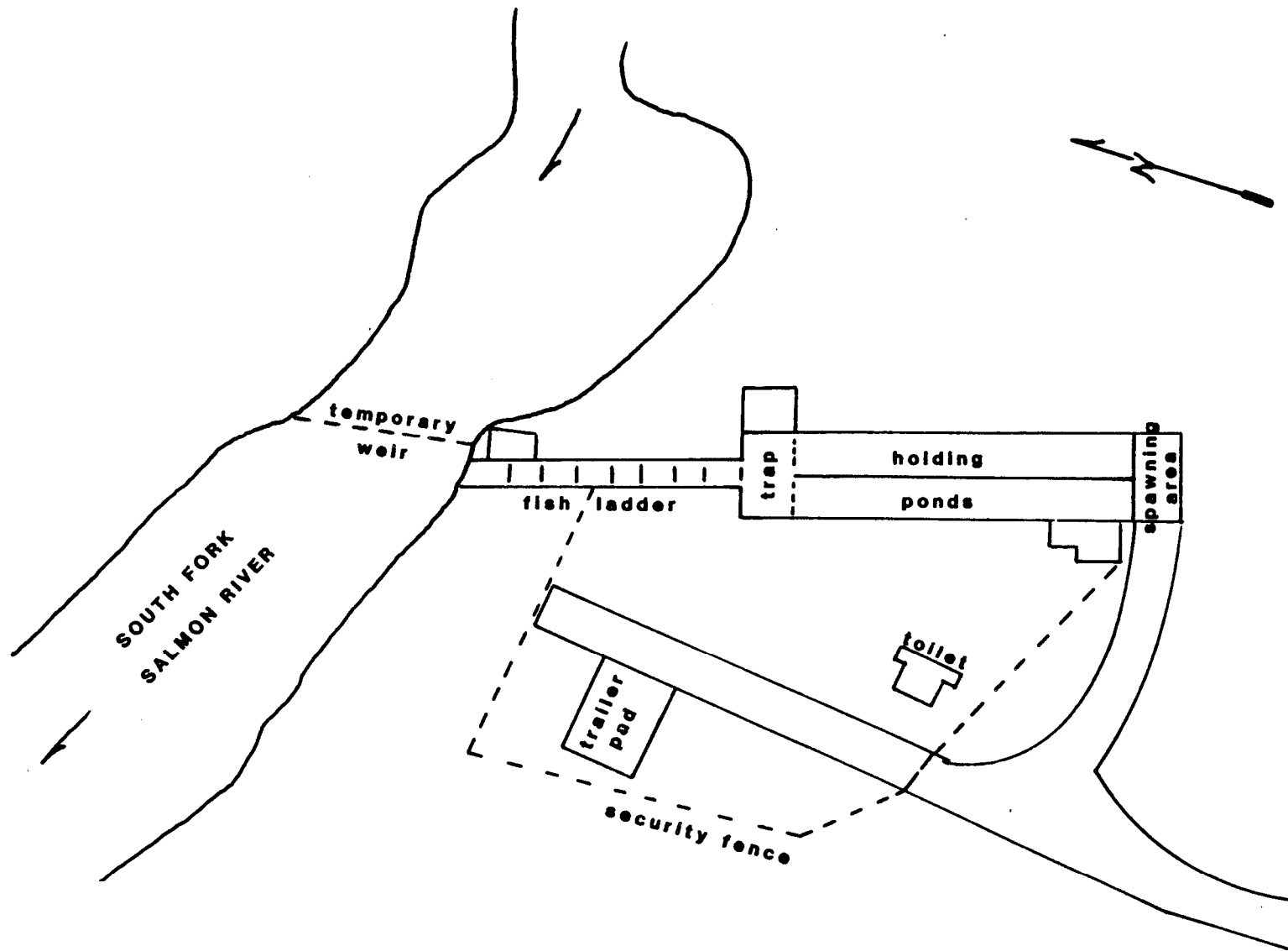
APPENDICES



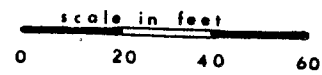
Appendix A. McCall Hatchery site plan.

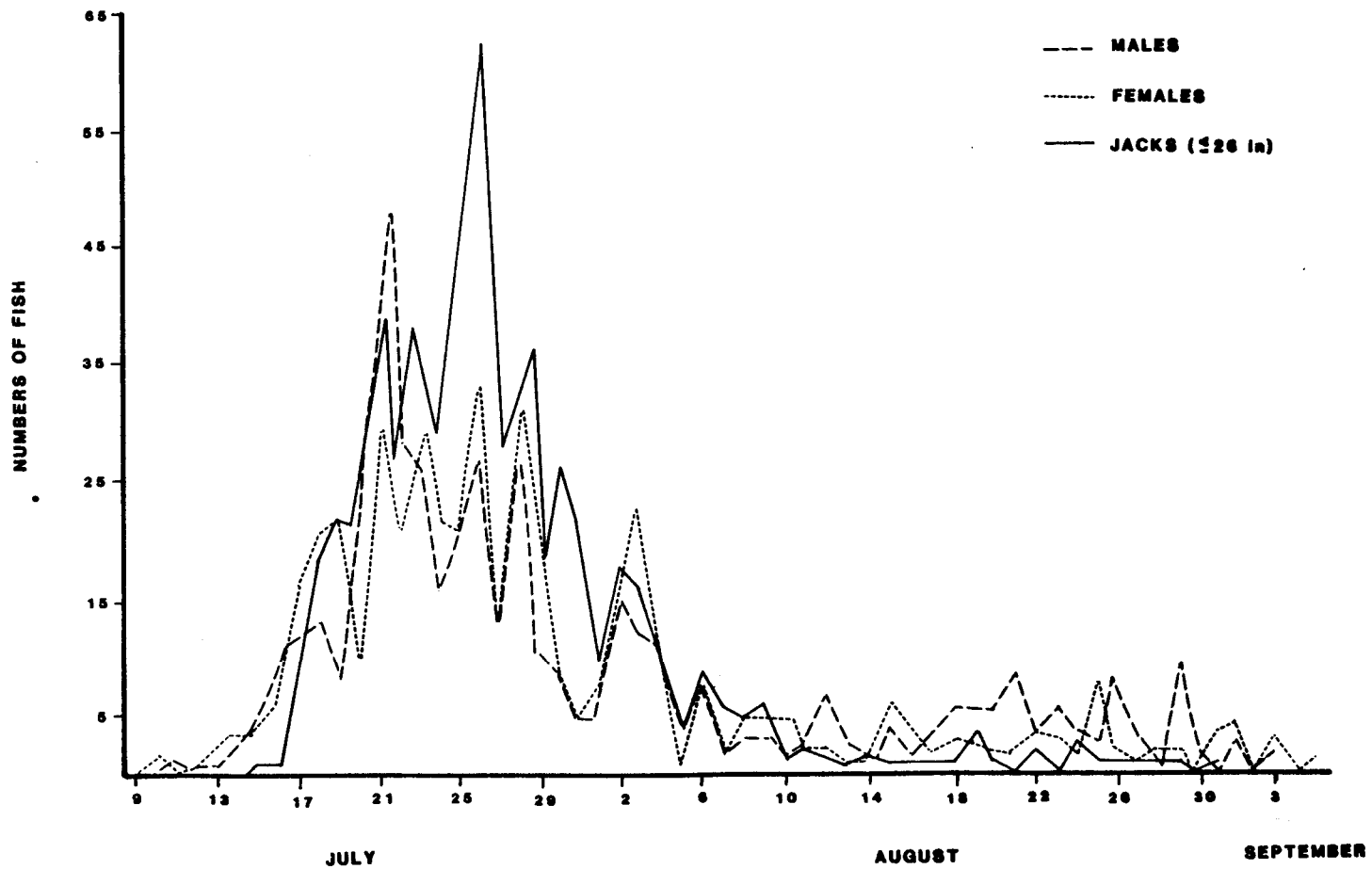
scale in feet
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Appendix B. South Fork Salmon River trapping facility site plan.





Appendix C. Timing, by sex, of returning adults to the South Fork Salmon River trap.

Appendix D. Lengths and numbers of returning adults to the South
Fork Salmon River 1984.

Fork Length (in)	Males	Females	Fork Length (in)	Males	Females
15	1	0	22	102	0
16.5	1	0	22.25	2	0
17	2	0	22.5	43	0
17.5	2	0	22.75	13	0
18	1	0	23	66	0
18.5	5	0	23.25	5	0
18.75	5	0	23.5	26	0
19	8	0	23.75	12	0
19.25	1	0	24	43	0
19.5	11	0	24.25	2	0
19.75	8	0	24.5	11	0
20	38	1	24.75	6	0
20.25	9	0	25	8	0
20.5	22	0	25.25	1	0
20.75	1	0	25.5	5	1
21	66	0	25.75	2	0
21.25	11	0	26	1	0
21.5	46	0	26.25	0	0
21.75	11	0	26.5	1	1

Appendix D. con't.

Fork Length (in)	Males	Females	Fork Length (in)	Males	Females
26.75	1	0	31.75	3	8
27	13	3	32	37	65
27.25	1	0	32.25	0	2
27.5	3	4	32.5	13	18
27.75	4	1	32.75	1	1
28	16	4	33	22	30
28.25	1	0	33.25	1	1
28.5	8	7	33.5	6	4
28.75	1	0	34	19	17
29	46	21	34.5	6	7
29.25	0	1	35	5	10
29.5	17	15	35.25	0	1
29.75	3	15	35.5	2	5
30	43	48	35.75	0	1
30.5	16	29	36	9	19
30.75	3	6	36.5	1	7
31	49	58	36.75	0	2
31.25	2	3	37	11	12
31.5	17	38	37.5	2	5

Appendix D. con't.

Fork Length (in)	Males	Females
38	4	9
38.5	1	1
39	8	6
39.5	2	0
40	7	0
40.5	1	0
41	16	0
41.5	4	0
42	7	0
42.5	3	0
43	7	0
43.5	1	0
44	2	0
Totals	1,042	487

Appendix E. Summary of chinook at McCall Hatchery 1978 - 1984.

Brood Year	Species	No. Eggs	Females Spawned	Eggs Per Female	Smolts Released	Ave. Fork Length (mm)	Fish Per Pound
1978	Summer chnk	-	-	-	124,800	-	13.0
1979	Summer chnk	429,453	-	-	248,926	134.0	17.5
1980	Summer chnk	204,116	53	3,851	122,247	140.5	17.8
1981	Summer chnk	482,941	124	3,895	183,896	134.3	20.3
1982	Summer chnk	648,520	147	4,412	269,880	136.4	15.6
1983 *	Summer chnk	750,634	180	4,170	-	-	-
1984	Summer chnk	1,613,392	353	4,571	-	-	-
1981 **	Spring chnk	647,555	160	4,047	167,895	108.6	28.7
1982	Spring chnk	451,902	82	5,511	230,550	135.7	15.9
1983	Spring chnk	650,196	128	5,080	-	-	-

* 30,990 Age-0 fish reared at Bozeman were released in Stolle Meadows 6/10/84. **

20,625 fish were transferred to Sawtooth in 1982 and later released.